

WHAT IS CLAIMED IS:

1. A thin film forming method, comprising the steps of:

5 employing a surface of a substrate as one electrode and disposing the surface of the substrate in a distance d (cm) apart from another electrode in a discharge space in which there are positioned at least a pair of electrodes connected to an RF power source;

10 introducing a gas containing one or more silicon compounds and hydrogen into the discharge space;

setting the product Pd of a film forming pressure P (Pa) and d and hydrogen flow rate M (SLM) so as to meet the relation:

$$80M + 200 \leq Pd \leq 160M + 333; \text{ and}$$

15 applying RF power to generate a plasma and to form a non-monocrystal silicon thin film on the substrate in the discharge space.

20 2. The thin film forming method as set forth in Claim 1, wherein said product Pd and flow rate L (SLM) of a gas mixture comprising said gas containing one or more silicon compounds and hydrogen are set so as to meet the relation:

$$67L + 200 \leq Pd \leq 147L + 333.$$

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3. The thin film forming method as set forth in Claim 1, wherein said distance d lies in a range of 0.5

to 3 cm.

4. The thin film forming method as set forth in  
Claim 1, wherein said hydrogen flow rate M ranges from  
5 500 sccm to 10000 sccm.

5. The thin film forming method as set forth in  
Claim 1, wherein a flow rate of said gas containing one  
or more of said silicon compounds ranges from 10 sccm  
10 to 1000 sccm.

6. A thin film forming method, comprising the  
steps of:

employing a surface of a substrate as one  
15 electrode and disposing the surface of the substrate in  
a distance d (cm) apart from another electrode in a  
discharge space in which there are positioned at least  
a pair of electrodes connected to an RF power source;  
introducing a gas containing one or more silicon  
20 compounds and hydrogen into the discharge space;

setting the product Pd of a film forming pressure  
P (Pa) and d and the ratio M/V of hydrogen flow rate M  
(SLM) to volume V (cm<sup>3</sup>) of the discharge space so as to  
meet the relation:

25  $4 \times 10^5 \text{ dM/V} + 200 \leq \text{Pd} \leq 8 \times 10^5 \text{ dM/V} + 333$ ; and  
applying RF power to generate a plasma and to form  
a non-monocrystal silicon thin film on the substrate in

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the discharge space.

7. The thin film forming method as set forth in Claim 6, wherein said product Pd and flow rate L (SLM) of a gas mixture comprising said gas containing one or more silicon compounds and hydrogen divided by said volume V (cm<sup>3</sup>) are set so as to meet the relation:

$$3.3 \times 10^5 \text{ dL/V} + 200 \leq \text{Pd} \leq 7.3 \times 10^5 \text{ dL/V} + 333.$$

8. The thin film forming method as set forth in Claim 6, wherein said distance d lies in a range of 0.5 to 3 cm.

9. The thin film forming method as set forth in Claim 6, wherein said hydrogen flow rate M ranges from 500 sccm to 10000 sccm.

10. The thin film forming method as set forth in Claim 6, wherein a flow rate of said gas containing one or more of said silicon compounds ranges from 10 sccm to 1000 sccm.